

# Haptoglobin Test for Cattle Health

**A** new, quick, and inexpensive test for a telltale protein could help tip off producers and veterinarians that a seemingly healthy cow has an internal infection, or that cattle on antibiotic treatments are indeed on the mend.

The protein, called haptoglobin, is undetectable in the blood of healthy cattle. But when a cow has an infection or inflammation that causes tissue damage, the animal's liver produces haptoglobin in abundance. High haptoglobin levels have been reported in the blood of cattle with mastitis, metritis, pyometra, traumatic reticulitis, abomasal displacement, traumatic pericarditis, bacterial nephritis, and hepatic lipidosis.

An early warning of rising haptoglobin levels could be useful to both the cattle producer and the veterinarian in managing herd health. But traditional diagnostic tests to measure haptoglobin levels were complex, labor-intensive laboratory procedures that took up to 2 days to complete.

ARS researchers Larry H. Stanker and Colin R. Young have "built a better mousetrap"—in this case, a test that pinpoints haptoglobin levels in hours rather than days. It uses test materials that are inexpensive, nonhazardous, and readily available and could be used "anywhere you can set up a card table," says Stanker. Stanker and Young are biologists at the ARS Food Animal Protection Research Laboratory at College Station, Texas.

The key to the Texas researchers' test is a monoclonal antibody they developed called Hap 1. If any haptoglobin—such as in a blood sample from a cow—comes in contact with the Hap 1 antibody, it will bind tightly to the antibody.

"To perform our test, you mix the blood sample with the Hap 1 antibody," explains Stanker.

"Then you put that mixture on a test plate that already has haptoglobin on the surface.

"If there's no haptoglobin in the cow's blood, the Hap 1 antibody will instead cling to the haptoglobin on the test plate. But if the cow's blood contains haptoglobin, it will have already bound up the Hap 1 antibody, so there's not much Hap 1 free to bind to the haptoglobin on the test plate."

DAVID NANCE



**A rapid onsite immunoassay test kit to measure blood levels of haptoglobin—a sure sign of infection in cattle—has been developed by ARS biologists Larry Stanker (left) and Colin Young. They hope that a commercial kit will soon be available to veterinarians and producers. (K7271-1)**

Stanker and Young have patented both the Hap 1 antibody and the diagnostic test. Now they're seeking a commercial partner to license the antibody and to test and develop a marketable version for field and lab use.

The ARS scientists' diagnostic test—called competitive inhibition assay—has proven very accurate, compared with results from the traditional haptoglobin measurement technique, says Stanker.

In one set of field tests, the ARS researchers checked haptoglobin levels in 84 veal calves. The competitive inhibition assay detected haptoglobin in all those calves that later were found to have inflammatory lesions.

In another study with 60 feedlot calves with respiratory disease, animals that received antibiotic treatment had lower haptoglobin levels at the final examination, compared with calves that did not receive antibiotics. This supports the idea that haptoglobin levels could be used to gauge an animal's response to therapy and the effectiveness of antibiotic treatments.

"If an animal's haptoglobin levels are quite high, that probably means the animal has an immune response to something going on," says Stanker. "But on the other hand, you wouldn't just check haptoglobin levels alone and, if they're normal, assume that everything is fine with those animals.

"Our hope is that haptoglobin levels could be checked as part of a series of diagnostic tests that also take a look at the animal's temperature and other factors. This would be simply another diagnostic tool in veterinary medicine."—By **Sandy Miller Hays**, ARS.

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